

9. TRMM INSTRUMENT OPERATIONS CENTERS

Operations of the five TRMM instruments are planned from 4 different facilities. Plans for VIRS and TMI will be done by the TRMM Science and Data Information System (TSDIS). PR operations requests will be issued by the NASDA Earth Observation Center (EOC), although TSDIS will be the interface between the EOC and the FOT. LIS and CERES operations will be planned by MSFC and LaRC, respectively. The FOT will execute the plans and will be responsible for real-time health and safety monitoring of all five instruments, but long term trending of the instruments is the responsibility of the respective instrument facilities and Instrument Scientists. The instrument facilities will also be responsible for science data processing. Each facility will receive spacecraft and instrument housekeeping data and their respective instrument's science data.

9.1 TRMM SCIENCE AND DATA INFORMATION SYSTEM

The TSDIS is comprised of two segments: the Science Operations Control Center (SOCC) and the Science Data Operations Center (SDOC). The SOCC is responsible for mission planning and scheduling requests for the PR, VIRS, and TMI instruments as described in Section 7.1.1.1. It will also support real-time instrument monitoring during daytime hours as necessary. The SDOC will receive Level-0 processed and Quicklook data products from SDPF and will perform higher level data processing.

9.1.1 TSDIS Real-Time Operations

A real-time remote display interface to the MOC will allow the TSDIS SOCC to observe telemetry data. Instrument telemetry pages will be developed and shall be available during all real-time supports for remote access at the SOCC. These telemetry pages are identical to the pages that are viewed in the MOC. The SOCC will monitor instrument housekeeping telemetry during real-time events. The MOC will provide general instrument health and safety monitoring during real-time events via PDB defined limits. The SOCC will have the capability to specify certain pages or groups of mnemonics to be stored (snapped) at predetermined intervals for later transfer to the SOCC.

9.1.2 TSDIS Data Processing

An essential responsibility of the SDOC is to provide data access to the science community. This function depends heavily on science data processing. The SDOC contains two subsystems, Data Ingest and Data Management, that receive, process, and store incoming data. The primary ingest functions are as follows:

- a. Capture and validate Level-0 and Quicklook data from SDPF.
- b. Capture non-TRMM data products for validation.
- c. Coordinate with data management for data archive.

The Data Management task provides a short-term archive of science and housekeeping data. The task maintains a catalog of data and provides a standard access method for various types of data. Like Data Ingest, this task processes Quicklook and Level-0 data products. With packet decommutation software from the various instrument teams, Data Management produces and stores files containing descriptions of the data types as well as data records.

9.1.3 Science Data Access Archive and Distribution

The GSFC Distributive Active Archive Center (DAAC) TRMM Support System (TSS) provides the facilities for TRMM science data archiving, product generation for CERES, and distribution to the science community and to TRMM scientists not directly supported by TSDIS.

After final processing, TSDIS will deliver Level 1A and other higher level data products from the PR, TMI, and VIRS and combined products to the DAAC TSS for archiving and subsequent retrieval by TRMM science user members.

9.2 NASDA EARTH OBSERVATION CENTER

The NASDA has total responsibility for the PR instrument, with EOC being the contact point for NASA during the mission operations phase. The EOC communicates with the TSDIS SOCC for instrument coordination, and performs off-line monitoring of PR instrument data. The EOC will also support data processing of the Level-0 and Quicklook data files provided by SDPF.

9.2.1 EOC Real-Time Operations

The EOC will not be involved with real-time operations for TRMM. PR instrument health and safety will be monitored by the FOT and the SOCC during real-time events. In addition, the SOCC will be notified in the event of a PR anomaly, and will inform the appropriate NASDA personnel.

9.2.2 EOC Data Processing

The EOC will provide higher level data processing of all Level-0 and Quicklook data for the PR. Level-0 and Quicklook data files will be provided daily by SDPF to the NASA/NASDA Interface Point. The EOC will also have the responsibility of providing the Japanese science community with access to the PR data. Long term trending will also be done for the PR at the EOC and TACC at Tsukuba Space Center.

9.3 LANGLEY RESEARCH CENTER

The Langley Research Center will be responsible for the CERES instrument, although daily instrument operations will be managed by the FOT. Non-routine instrument command requests will be communicated to the FOT from LaRC. Instrument planning and scheduling activities are detailed in section 7.1. Real-time monitoring will be handled at the LaRC CERES Instrument Monitoring System while data handling from SDPF will be the responsibility of the LaRC Distributed Active Archive Center (DAAC).

9.3.1 LaRC Real-Time Operations

A real-time remote display interface to the MOC will be provided to allow LaRC to observe telemetry data. Instrument telemetry pages will be developed and shall be available during all real-time supports for remote access at the LaRC CERES Instrument Operations Monitoring System. The MOC will provide general instrument health and safety monitoring during real-time events via PDB defined limits. LaRC will have the capability to specify certain pages or groups of mnemonics to be printed (snapped) at predetermined intervals for later transfer to the CERES Instrument Operations Monitoring System.

9.3.2 LaRC Data Processing

The LaRC DAAC will be the recipient of all CERES Quicklook and Level-0 data products from SDPF. The DAAC will process the data products as specified by the CERES science team. Any special requests for Quicklooks must be made to Pacor directly. The DAAC will also provide long-term data storage of the CERES instrument data after mission termination.

9.4 MARSHALL SPACE FLIGHT CENTER

The LIS Science Computing Facility, which is off-site of MSFC, directly interfaces with the MOC and the FOT and is the FOT's point of contact for LIS instrument planning (details in section 7.1) and real-time monitoring. Quicklook and Level-0 data will be delivered from the SDPF to the LIS SCF for processing and storage.

9.4.1 MSFC Real-Time Operations

A real-time remote display interface to the MOC will be provided to allow MSFC to observe telemetry data. Instrument telemetry pages will be developed and shall be available during all real-time supports for remote access at the MSFC LIS Science Computing Facility. The MOC will provide general instrument health and safety monitoring during real-time events via PDB defined limits. MSFC will have the capability to specify certain pages or groups of mnemonics to be printed (snapped) at predetermined intervals for later transfer to LIS Science Computing Facility.

9.4.2 MSFC Data Processing

The LIS SCF will receive the LIS Level-0 and Quicklook data files from SDPF. Processing of the data will be done according to specifications of the LIS science team. Algorithms, as developed in the Science Computing Facility, will be used for data processing. Data in the LIS SCF will be saved for use after the TRMM mission.